

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-77 (cancelled)

Claims 78-222 (withdrawn)

Claim 223 (currently amended): A prime mover output control system, comprising

- a) a prime mover, comprising a mechanical output comprising a rotational velocity and a torque; and
- b) a generator, powered by said prime mover, and providing an adjustable torque load on said prime mover,

wherein said prime mover comprises a characteristic of acceleration and deceleration according in response to said torque load on said prime mover, towards ~~a synchronous~~ an equilibrium speed with said generator; and

- c) a control mechanism electrically connected to said generator, comprising an input for signaling a system power output requirement, said control mechanism providing control over said adjustable torque load of said generator, said adjustable torque load being reduced when said rotational velocity of said prime mover is not sufficient to produce said power output requirement, said adjustable torque load being increased when said rotational velocity of said prime mover is in excess for the production of said power output requirement, to effect a product of prime mover rotational velocity and torque to substantially meet said system power output requirement.

Claim 224 (previously added): The system of claim 223 wherein said control over said adjustable torque load, comprising a torque load decrease in response to a requirement of a system power output increase, and a torque load increase in response to a requirement for a system power output decrease.

Claim 225 (previously added): The system of claim 223 wherein said control mechanism further comprising graphical or mechanical techniques for use in determining said torque load.

**Claim 226 (previously amended):** The system of claim 224 wherein said control over said adjustable torque load comprising adjustment of said torque load in response to a changed system power output requirement, in a single step.

**Claim 227 (previously amended):** The system of claim 226 wherein said generator supplying power to an electrical load, and further comprising an energy storage unit connected to said control mechanism, said energy storage unit for supplying said electrical load with said system power output requirement, substantially irrespective of prime mover output fluctuations caused by prime mover power output change.

**Claim 228 (previously amended):** The system of claim 226 wherein said generator supplying electricity to an electrical load, and further not comprising substantial electricity storage between said generator and said electrical load.

**Claim 229 (previously amended):** The system of claim 224 wherein said control over said adjustable torque load comprising adjustment of said torque load in response to a changed system power output requirement in a plurality of stages.

**Claim 230 (previously amended):** The system of claim 224 wherein said control over said adjustable torque load comprising adjustment of said torque load in response to a changed system power requirement, to a torque load beyond a torque load required to achieve said changed system power output requirement, and a restoration to said torque load required to achieve said changed system power output requirement, when said changed system power requirement is reached by said prime mover.

**Claim 231 (previously amended):** The system of claim 224 wherein said control mechanism comprising gearing between said prime mover and said generator.

**Claim 232 (previously amended):** The system of claim 224, further comprising an energy storage unit connected to said control mechanism.

**Claim 233 (previously added):** The system of claim 224 wherein said generator supplying power to an electrical load, and wherein said control mechanism comprising electronic

components for the adjustment of the current drawn from the generator, to effect control over the torque load of the generator.

**Claim 234 (previously added):** The system of claim 233 wherein said electronic components comprising a power electronic load electrically connected between said generator and said electrical load, said power electronic load comprising a controllable current draw from said generator, wherein said torque load of said generator being directly related to said current draw.

**Claim 235 (previously added):** The system of claim 234 wherein said generator comprising a direct current generator and wherein said controllable current draw of said power electronic load comprising a controllable relationship of current versus voltage from said generator.

**Claim 236 (previously amended):** The system of claim 234 wherein said generator comprising an alternating current synchronous machine and wherein said power electronic load comprising a control element for adjustment of said controllable current draw, based on a desired relationship between a sampled generator output current and a sampled generator output voltage.

**Claim 237 (previously amended):** The system of claim 234 wherein said generator comprising an alternating current synchronous machine and wherein said power electronic load comprising a control element for adjustment of a frequency component of said power, providing said controllable current draw.

**Claim 236 (previously added):** The system of claim 234 wherein said generator comprising an alternating current synchronous permanent magnet machine and wherein said power electronic load comprising a control element for adjustment of said controllable current draw, based on a desired relationship between a sampled generator output current and a sampled generator output voltage,

**Claim 237 (previously added):** The system of claim 234 wherein said generator comprising an alternating current synchronous permanent magnet machine and wherein said power

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~~electronic load comprising a control element for adjustment of a frequency component of, providing said controllable current draw.~~

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**Claim 238 (previously added):** The system of claim 234 wherein said generator comprising an alternating current synchronous externally excited machine comprising fixed excitation, and wherein said input of said power electronic load from said generator comprising a controllable current versus voltage relationship comprising said controllable current draw.

**Claim 239 (previously added):** The system of claim 234 wherein said generator comprising an alternating current synchronous externally excited machine having fixed excitation, and wherein said input of said power electronic load from said generator comprising a controllable frequency, providing said controllable current draw.

**Claim 240 (previously added):** The system of claim 234 wherein said generator comprising an alternating current induction machine and wherein said input of said power electronic load from said generator comprising a controllable frequency, providing said controllable current draw.

**Claim 241 (previously amended):** The system of claim 234 wherein said power electronic load comprising an operating range comprising positive incremental resistance over part or all of said operating range.

**Claim 242 (previously added):** The system of claim 241 wherein said power electronic load having

- a) a threshold voltage; below said threshold voltage, said current draw is very low or nil, and above said threshold voltage, said current draw increases steeply versus voltage,
- b) a threshold voltage adjuster for controlling said threshold voltage, and thereby, said current draw from the generator.

**Claim 243 (previously amended):** The system of claim 242 wherein said threshold voltage adjuster further connected to said input for signaling a system power output requirement, and further comprising graphical or mathematical techniques for determining said threshold voltage in accordance with said system power output requirement.

**Claim 244 (previously amended):** The system of claim 243 wherein said threshold voltage adjuster comprising means to increase said threshold voltage in response to an input signal describing a power output requirement increase, and means to decrease said threshold voltage in response to an input signal describing a power output requirement decrease.

**Claim 245 (previously amended):** The system of claim 236 wherein said power electronic load comprises a boost converter.

**Claim 246 (previously added):** The system of claim 224 wherein said mechanical load comprising a generator supplying power to an electrical load comprising variable resistance, and wherein said generator being configured to have a torque load directly related to the current draw of said electrical load from said generator and wherein said control mechanism comprising control over said variable resistance to control said torque load.

**Claim 247 (previously added):** The system of claim 246 wherein said generator being a direct current machine.

**Claim 248 (previously added):** The system of claim 246 wherein said generator being an alternating current machine.

**Claim 249 (previously added):** The system of claim 246 wherein said variable resistance comprising one or more variable resistors.

**Claim 250 (previously added):** The system of claim 249 wherein said variable resistance comprising a plurality of fixed resistance resistors, and wherein said control mechanism comprising switches for switching different resistors in and out of a circuit to provide said control over said variable resistance.

**Claim 251 (previously added):** The system of claim 250 wherein said variable resistors comprising variable resistance heaters.

**Claim 252 (previously amended):** The system of claim 224 wherein said generator comprising adjustable excitation, and wherein said generator being configured to have a torque load

directly related to its excitation, and wherein said control mechanism comprising control over said adjustable excitation to control said torque load.

**Claim 253 (previously added):** The system of claim 252 wherein said control mechanism comprising control over the relationship between the synchronous speed and the torque load of the generator

**Claim 254 (previously added):** The system of claim 253 wherein said generator being a direct current independent wound commutated machine.

**Claim 255 (previously added):** The system of claim 254 wherein said generator being a direct current independent wound brushless machine.

**Claim 256 (canceled)**

**Claim 257 (previously added):** The system of claim 255 wherein said generator being an alternating current synchronous machine.

**Claim 258 (previously added):** The system of claim 254 wherein said generator being an alternating current induction machine, and wherein said control mechanism comprising a quadrature current controller for varying the supply of quadrature current to the induction machine.

**Claim 259 (previously added):** The system of claim 223 wherein said mechanical load comprising:

- a) a generator, and
- b) a power electronic load, and
- c) energy storage, and
- d) an electrical load

wherein said power electronic load comprising an electrical input from said generator and being configured to control the current draw of said electrical input; thereby controlling the torque draw of the mechanical load; and wherein said energy storage connected to said power electronic load, and wherein said electrical load connected to said energy storage.

**Claim 260 (previously added):** The system of claim 259 further comprising a controller having an input from said energy storage, and wherein said electrical load having an input from said controller, wherein said controller comprising control over the characteristics of the electrical input to said electrical load.

**Claim 261 (previously added):** The system of claim 260, wherein said energy storage being a battery.

**Claim 262 (previously added):** The system of claim 261, wherein said generator being a direct current or a rectified alternating current generator, and wherein said battery having a higher voltage than the voltage of said input of said power electronic load from said generator and wherein said power electronic load comprising a boost converter located between said generator and said battery.

**Claim 263 (previously added):** The system of claim 262, wherein said generator being a direct current or rectified alternating current generator, and wherein said battery having a lower voltage than the voltage of said input of said power electronic load from said generator, and wherein said power electronic load comprising a buck converter connected between the generator and the battery.

**Claim 264 (previously added):** The system of claim 261 further comprising a position sensing mechanism mechanically coupled to said prime mover, for commanding said control mechanism to apply an appropriate torque load at appropriate times during cyclic variations of said prime mover to mechanically assist said prime mover.

**Claim 265 (previously added):** The system of claim 264, wherein said position sensing mechanism comprising a rotor position sensor.

**Claim 266 (previously added):** The system of claim 261, wherein said generator being a brush commutated direct current generator or a brushless direct current motor modified with suitable backdiodes so as to be capable of generator operation and wherein said power electronic load comprising

a) the capability to source power from said energy storage, and

- b) said electrical input to said power electronic load comprising an input voltage and an input current, said input current being controllable by said power electronic load to have current versus said input voltage characteristics that cause the automatic transition of generator to motor action and motor to generator action, around voltages related to said input voltage to have the following characteristics:
- c) a high ratio of current draw to input voltage of above said threshold voltage, and a high negative ratio of current draw to input voltage of below said threshold voltage, whereby said generator transitions to motor action during reduced voltage periods that occur when said prime mover is engaged in substantially non power-producing periods.

**Claim 267 (previously added):** The system of claim 266, wherein said power electronic load comprising a combination boost and buck converter connected between said generator and said energy storage.

**Claim 268 (previously added):** The system of claim 261 wherein said power electronic load comprising current draw versus input voltage characteristics to cause a dynamic reduction of current draw from said generator during periods of reduced generator voltage.

**Claim 269 (previously added):** The system of claim 261 wherein said power electronic load comprising a receptor for receiving a signal to start said system, and being configured to respond to said signal with the synthesis of suitable current and voltage characteristics for the sourcing of power from said energy storage to said generator, whereby causing said generator to act as a starting motor to said prime mover.

**Claim 270 (previously added):** The system of claim 269 wherein said generator being a brush commutated direct current generator.

**Claim 271 (previously added):** The system of claim 269 wherein said generator being a brushless direct current motors modified with suitable backdiodes so as to be capable of generator operation.



**Claim 272 (previously added):** The system of claim 269 wherein said generator being a rectified alternating current generator and wherein said power electronic load comprising an input of controllable frequency.

**Claim 273 (previously amended):** The system of claim 223 wherein said generator having an excitation current of adjustable frequency, and wherein said control mechanism comprising a generator excitation control for controlling said excitation current of said generator to effect control over said torque load on said prime mover, and wherein said system further comprising:

- a) energy storage, connected to the output of said generator, and
- b) an electrical load connected to said energy storage.

**Claim 274 (previously added):** The system of claim 273 wherein said generator comprising an alternating current generator capable of motor operation, and wherein said generator excitation control for controlling said frequency of said generator excitation current, and comprising a power electronic load, connected between said generator and said energy storage, for the sourcing and sinking of power.

**Claim 275 (previously added):** The system of claim 274 wherein said generator excitation control further comprising an input for receiving a signal to start said system, and comprising a programmed response to said signal of an increase in said excitation frequency from zero, and the sourcing of suitably synthesized current from said energy storage, and a startup heat source in said prime mover, in the case that said prime mover is of the type that requires a startup heat source to begin operation.

**Claim 276 (previously added):** The system of claim 275 wherein said generator being an induction motor capable of acting as a generator, and wherein said generator excitation control comprising an inverter for synthesizing quadrature excitation current with an adjustable frequency for said generator.

**Claim 277 (previously added):** The system of claim 276 wherein said generator excitation control comprising:

- a) means to source current from said energy storage to power said generator as a motor, and
- b) permitting a natural generator to motor transition during cyclic power output changes of said prime mover, whereby said generator acts as a motor during periods of substantially reduced prime mover torque output.

**Claim 278 (previously added):** The system of claim 277 wherein said prime mover does not comprise a flywheel.

**Claim 279 (previously amended):** The system of claim 273 wherein said generator excitation control further comprising

- a) an input for receiving a signal to start said system,
- b) means to increase inverter frequency in response to said signal, and
- c) a power electronic load connected between said generator and said energy storage, for causing said energy storage to supply operating power to said generator; whereby said prime mover may be started.

**Claim 280 (previously amended):** The system of claim 223 wherein said generator for generating alternating current and comprising electrical terminals, and wherein said control mechanism comprising a power electronic load, connected to said electrical terminals of said generator, said power electronic load comprising rectifier components, for converting alternating current to direct current, and wherein said power electronic load comprising control over the frequency of said alternating current, to effect control over said torque load of said generator on said prime mover; said system further comprising energy storage, connected to said power electronic load, and an electrical load, connected to said energy storage.

**Claim 281 (previously added):** The system of claim 280 further comprising a controller electrically connected between said energy storage and said electrical load for supplying power to said electrical load at substantially the electrical requirements of said electrical load.

**Claim 282 (previously added):** The system of claim 281, wherein said energy storage being a battery.

**Claim 283 (previously added):** The system of claim 282 wherein said power electronic load comprising an inverter and a boost converter, electrically connected between said generator and said energy storage.

**Claim 284 (previously added):** The system of claim 283 further including: a position sensing mechanism mechanically coupled to said prime mover for sensing the position of said prime mover during different parts of a prime mover power cycle, and connected to said power electronic load for commanding an increase in said frequency during parts of said prime mover power cycle during which said prime mover power output is substantially low or zero.

**Claim 285 (previously added):** The system of claim 284 in which said increase in said frequency being sufficient to cause said generator to transition to motoring mode.

**Claim 286 (previously added):** The system of claim 285 wherein said generator is an induction generator.

**Claim 287 (previously added):** The system of claim 286, wherein said power electronic load comprising a current draw versus frequency characteristic being steep enough to cause a dynamic reduction of generator current draw during periods when said frequency of said electrical input of said generator is low.

**Claim 288 (previously added):** The system of claim 287 wherein said prime mover comprising a heat engine and comprising a startup heat source, and wherein said generator being capable of acting as a motor, and wherein said power electronic load being electrically connected between said electrical generator and said energy storage and comprising rectifier elements and comprising control over the frequency of said electrical current from said energy storage to said generator to power said generator as a motor and wherein said input for signaling a system power output requirement also for signaling to start said system power output requirement from zero, said signal for commanding to start said system power output requirement from zero for commanding the powering of said generator as a motor, until a synchronous speed is reached whereby said generator may be used as a starting motor to said prime mover.

**Claim 289 (previously added):** The system of claim 284 wherein said power electronic load further comprising: a position sensing mechanism for commanding a the powering of said generator as a motor during time periods when said prime mover is engaged in a substantially non-power producing stroke.

**Claim 290 (previously amended):** The system of claim 223 further comprising energy storage and wherein said mechanical load comprising a generator, for supplying electrical power to an electrical load, and wherein said control mechanism comprising an electrical input from said generator and being configured to control the resistance of said input to effect control over said torque load; and wherein said control mechanism comprising an electrical output to said energy storage.

**Claim 291 (previously amended):** The system of claim 290 further comprising a controller, electrically connected between said energy storage unit, and said electrical load having control over the conversion of electrical power from said energy storage to said electrical load to substantially the electrical requirements of said electrical load.

**Claim 292 (previously added):** The system of claim 291, wherein said energy storage comprising a battery.

**Claim 293 (previously added):** The system of claim 292 further comprising: a position sensing mechanism for determining non-power producing prime mover power cycle portions and for commanding said control mechanism to produce a dynamic resistance increase substantially during non-power producing prime mover power cycle portions.

**Claim 294 (previously added):** The system of claim 234 wherein said generator comprising a direct current generator and wherein said power electronic load comprising

- a) voltage and current sampling means for sampling the input voltage and input current from said generator; and
- b) an adjustable threshold voltage; and
- c) means for comparing a scaled voltage proportional to said input current, with the amount of said input voltage above said threshold voltage; and,
- d) a switching control element for controlling the current draw from said generator; and

- e) means for adjusting said switching control element according to any differences between said scaled voltage and said voltage above threshold.

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